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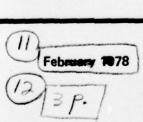UNCLASSIFIED   HUMRRO-PP-5-78   NL

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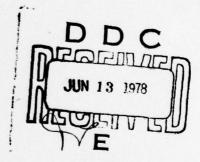DATE
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Some Considerations in Analyzing Training Costs and Job Performance.

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SOME CONSIDERATIONS IN ANALYZING TRAINING
COSTS AND JOB PERFORMANCE

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All of us appreciate that huge sums of money are spent
each year for training. We are also aware that military plan-
ners are concerned that training be optimally relevant and
achievable at the lowest cost. That is to say, skills and
knowledges that pertain to the actual performance requirements
of jobs must be developed in future job holders in the most
efficient manner possible. To achieve cost/effectiveness, all
of the Services currently emphasize a systems approach to de-
signing and managing training.

Various models of military training systems have been
called Systems Approach to Training, Systems Engineering of
Training and, more recently, Instructional Systems Develop-
ment. These variously named methodologies emphasize front-end
analysis, iterative design, validation, and feedback from the
field. Each model for the development of training programs
has been designed to insure that the goals of training are
achieved, that these goals are relevant to the requirements of
the job, that they will be achieved by a majority of the
trainees, and that the costs of the training are minimized.

A most distinctive feature of these various methodologies
is that they require analysis of training content and outcome
at the level of specific tasks. Analysis and measurement are
initiated with the identification of a task that must be per-
formed as part of a job. Examples are: cleaning a carburetor,
welding a joint, drafting a business letter, or translating a
Russian newspaper article. To begin at the beginning, a job
is identified, tasks within the job are specified, training
objectives for each task are stated, training outcome and the
ultimate determination of job competence are measured by the
trainee's (or new job incumbent's) ability to perform specific
tasks. Most important, but rarely demonstrated, is that the
training has relevance to the job. Training relevance is

determined by how closely the tasks in which competence has been developed match the tasks done on the job.

We contend that the use of the task as the unit of analysis and measurement should be extended to cost/effectiveness studies of training. Measuring performance at the level of the task will provide a more sensitive means for detecting training inefficiency. Definitive comparisons can be made among students from the same training program and even from different programs. Comparisons can also be made between the performance of graduates and the frequency of assignment to the "trained" tasks on the job. Comparisons between performance and requirements can thus be used to identify under-training and overtraining.

In the past, studies of the effectiveness of training have tended to use measures of output that were of a global nature. For example, supervisors filled out rating forms with such items as "professional performance" and "military appearance." Such indices of output mask or are irrelevant to effects at the task level.

More recently, training has been evaluated by measuring outcomes that were intermediate in nature--for example, counting the number of graduates per unit of time. Descriptions of this kind assume that different varieties of training are essentially equivalent and product equivalent products. To evaluate training in terms of the number of trainees who are performing in nominally similar jobs is to assume that alternate training programs are equally appropriate to different duty positions or billets. These assumptions disregard effectiveness and measure instead the efficiency of the delivery system.

Most approaches to the evaluation of training effectiveness fail to go beyond the training process itself. They do not require or even imply that performance on the job should be measured by the retention and application of skill and knowledge in different job settings. Most studies focus on what is learned in the most immediate sense; for example, whether exposure to a particular audio-visual device or simulator results in more effective learning as evidenced by course grade. The correlation between grades and job performance is, of course, at best imperfect. This is perfectly true when grades are conditioned, as they so often are, by verbal skills and the ability to do well on paper-and-pencil tests of information.

To assess training output adequately, we need to direct our attention to the measurement of task performance at least at the completion of training, or better still, after arrival on the job. Task-level performance tests have been used in the past mostly for research purposes. However, the Army, in the Skill Qualification Testing program, has been developing

System for at least two years. Where the use of task-level performance tests is either inappropriate or not possible for cost or other reasons, performance-based written tests for tasks are being developed. Also, a supervisor rating procedure for evaluating the performance of specific tasks is being developed in the so-called Performance Certification component of Skill Qualification Tests.

Supervisor ratings may yet develop into the best method for evaluating the cost-effectiveness of training programs. Ratings of job/task performance are clearly the most feasible means for assessing job performance. In a study for the Office of Naval Research, we recently developed scales for rating performance at the task level in ten Navy jobs. Items were derived using data from the Navy Occupational Task Analysis Program (NOTAP) and from an analysis of these same jobs using McCormick's Position Analysis Questionnaire (PAQ). Supervisors evaluated performance in from 40 to 93 tasks based on NOTAP job descriptions and from 34 to 56 items based on the PAQ job analysis.* The supervisors were able to discriminate differences in job performance of their assigned subordinates at this level of analysis.

In summary, a task-level approach to cost-effectiveness analysis would use information from an analysis of training content, from occupational analysis, and from performance ratings. It would relate the costs of training and number of tasks in which training is provided to the number of tasks in which proficiency is attained at the completion of training. Thus, the effectiveness of a training program might be expressed by the number of tasks taught, times the quality of performance. Similarly, training costs could also be related to the actual frequency and quality of task performance in different types of jobs.

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*Differences in the number of items administered were based on the Navy job and pay grade of the incumbent being rated.